N° 6982 A.D. 1899

Date of Application, 1st Apr., 1899

Complete Specification Left, 31st Jan., 1900—Accepted, 3rd Mar., 1900

PROVISIONAL SPECIFICATION.

Improvements in Apparatus employed in Wireless Telegraphy.

We, Guglielmo Marconi, Electrician, and The Wireless Telegraph and Signal Company, Limited, both of 28, Park Lane, in the City of London, do hereby declare the nature of this invention to be as follows:—

This invention relates to the induction coils employed as described in the Specification No. 12,326 of 1898.

In place of winding both the primary and secondary in single layers as claimed in that Specification the coils are now either made very short (not much exceeding two centimetres in length) or else are wound in sections. The number of turns in the successive layers of the secondary (and sometimes of the primary also) preferably diminish as the distance from the centre increases. It is also found desirable to connect direct to the sensitive tube or imperfect contact (not through the condenser) the end of the secondary which is furthest away from the nucleus.

Figures 1 to 6 are diagrams of coils which have been successfully used—P is the primary and S the secondary. The primary is to distinguish it from the secondary shown as a thick line although usually the wires of both are of exactly the same diameter.

The diagrams are greatly enlarged half longitudinal sections but are not strictly to scale. In place also of showing the section of each coil or layer of wire as a longitudinal row of dots or small circles as it would actually appear it is for simplicity shown as a single continuous longitudinal straight line. A is the end of the primary which is connected to the aerial conductor and E is the end connected to earth or a capacity. J is the end of the secondary which is directly connected to the sensitive tube or imperfect contact and C is the end which is connected to it through the condenser. G is a glass tube on which the coils are wound.

The wires are insulated by a single covering of silk.

The following table gives particulars of these coils.

BIRMINGHAM FREE LIBRARIES

[*Price* 8*d.*]

Figure in Drawings.	Diameter of Tube G in centimetres.	Diameter of Wires in centimetres.		Number of Turns in Windings.		Length in centimetres.
		Primary.	Secondary.	Primary.	Secondary.	
Fig. 1	·935	·01	·01	2 layers of 160 turns each in parallel.	3 sections of 10, 12, 10 layers with 150 45 40 45 40 39 40 35 37 35 30 35 30 25 33 25 20 29 20 15 25 15 12 21 17 5 15 14 10 5 turns	2·5
Fig. 2	·935	·012	·012	2 layers of 160 turns each in parallel.	4 sections of 9 layers each with 40 | 80 | 40 35 | 35 | 35 | 35 30 | 30 | 30 | 30 27 | 27 | 27 | 27 23 | 23 | 23 | 23 20 | 20 | 20 | 20 15 | 15 | 15 | 15 10 | 10 | 10 | 10 5 | 5 | 5 | 5 turns	4·0

Fig. 3	·937	·011	·011	2 layers of 160 turns each in parallel.	2 sections of 15 layers each with 153 60 63 50 50 40 40 35 35 33 33 30 30 27 27 24 24 23 22 17 18 15 15 10 10 6 6 2 2 turns	2·5
Fig. 4.	·975	·012	·012	2 layers of 110 each in parallel.	12 layers of 100 80 75 60 50 45 40 28 20 15 10 5 turns	1·8

Figure in Drawings.	Diameter of Tube G in centimetres.	Diameters of Wires in centimetres.		Number of Turns in Windings.		Length in centimetres.
		Primary.	Secondary.	Primary.	Secondary.	
Fig. 5	·975	·012	·012	4 layers 80 turns } in series 78 ,, } 76 turns } in series 72 ,, }	16 layers of 60 54 46 42 40 36 32 29 26 23 20 18 14 12 9 7 turns	1·5
Fig. 6	·975	·012	·012	One layer of two wires in parallel with 160 turns each wound tandem	3 layers of 310, 45, 45 turns	5·8

The method in which the sections of the coil are connected is found to be important.

Dated this 30th day of March 1899.

G. MARCONI.
Carpmael & Co.,
Agents for the Applicants.

COMPLETE SPECIFICATION.

Improvements in Apparatus employed in Wireless Telegraphy.

We, GUGLIELMO MARCONI, Electrician, and THE WIRELESS TELEGRAPH AND SIGNAL COMPANY, LIMITED, both of 28, Mark Lane, in the City of London, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

This invention relates to certain forms of induction coils employed as described in the Specification No 12326 of 1898.

The coils are most effective either when made very short (not much exceeding two centimetres in length) or when they are wound in sections. The number of turns in the successive layers of the secondary (and sometimes of the primary also) should diminish as the distance from the centre increases but this although desirable is not essential. It is also found desirable to connect direct to the sensitive tube or imperfect contact (not through the condenser) the end of the secondary which is furthest away from the nucleus.

Figures 1 to 6 of the drawings lodged with the Provisional Specification are diagrams of various forms of induction coil which have been successfully used. P is the primary and S the secondary. The primary is to distinguish it from the secondary, shown as a thick line although usually the wires of both are of exactly the same diameter.

The diagrams are greatly enlarged half longitudinal sections but are not strictly to scale. In place also of showing the section of each coil or layer of wire as a longitudinal row of dots or small circles as it would actually appear it is for simplicity shown as a single continuous longitudinal straight line. A is the end of the primary which is connected to the aerial conductor and E is the end connected to earth or a capacity. J is the end of the secondary which is directly connected to the sensitive tube or imperfect contact and C is the end which is connected to it through the condenser. G may be a glass tube on which the coils are wound.

The wires are preferably insulated by a single covering of silk.

The following table gives particulars of coils which have been successfully used.

Figure in Drawings.	Diameter of Tube G in centimetres.	Diameter of Wires in centimetres.		Resistance in Ohms.		Number of Turns in Windings.		Length in centimetres.
		Primary.	Secondary.	Primary.	Secondary.	Primary.	Secondary.	
Fig. 1	·937	·01	·01			2 layers of 160 turns each in parallel.	3 sections of 10, 12, 10 layers with 150 45 40 45 40 39 40 35 37 35 30 35 30 25 33 25 20 29 20 15 25 15 12 21 17 5 15 14 10 5 turns	2·5
Fig. 2	·935	·012	·012			2 layers of 160 turns each in parallel.	4 sections of 9 layers each with 40 80 40 35 35 35 35 30 30 30 30 27 27 27 27 23 23 23 23 20 20 20 20 15 15 15 15 10 10 10 10 5 5 5 5 turns	4·0

Fig. 3	·937	·011	·011	4·8	61	2 layers of 160 turns each in parallel.	2 sections of 15 layers each with 153 60 63 50 50 40 40 35 35 33 33 30 30 27 27 24 24 23 22 17 18 15 15 10 10 6 6 2 2 turns	2·5
Fig. 4.	·975	·012	·012			2 layers of 110 each in parallel.	12 layers of 100 80 75 60 50 45 40 28 20 15 10 5 turns	1·8

Figure in Drawings.	Diameter of Tube G in centimetres.	Diameter of Wires in centimetres.		Resistance in Ohms.		Number of Turns in Windings.		Length in centimetres.
		Primary.	Secondary.	Primary.	Secondary.	Primary.	Secondary.	
Fig. 5	·975	·012	·012			4 layers 80 turns } in series 78 „ } 76 turns } in series 72 „ }	16 layers of 60 54 46 42 40 36 32 29 26 23 20 18 14 12 9 7 turns	1·5
Fig. 6	·975	·012	·012	5·75	28·5	One layer of two wires in parallel with 160 turns each wound tandem.	3 layers of 310, 45, 45 turns	5·8

The method in which the sections of the coil are connected is found to be important and the general arrangements have been described in the said Specification 12326 of 1898.

When using the above described induction coils or transformers there is usually employed as the vertical wire at each station a conductor formed of seven strands of about 1 millimetre diameter copper wire 140 feet long, the top of the conductor being about 100 feet from the ground.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. Constructing induction coils for use in combination with sensitive tubes or similar forms of sensitive or imperfect conductors for the purpose of indicating the passage of Hertzian waves with the secondary of several layers the number of turns in the outer layers being less than in those next the primary.

2. Constructing induction coils for use in combination with sensitive tubes or similar forms of sensitive or imperfect conductors for the purpose of indicating the passage of Hertzian waves with the secondary of the coil in two or more sections.

3. Constructing induction coils for use in combination with sensitive tubes or similar forms of sensitive or imperfect conductors for the purpose of indicating the passage of Hertzian waves substantially as described and illustrated in Figures 1, 2, 3, 4, 5 and 6.

Dated this 31st day of January 1900.

GUGLIELMO MARCONI.
HENRY S. SAUNDERS, } Directors.
H. JAMESON DAVIS, }
HENRY W. ALLEN, Secretary.

Redhill: Printed for Her Majesty's Stationery Office, by Malcomson & Co., Ltd.—1900.

A.D. 1899. April 1. N.º 6982.

MARCONI & *others'* Provisional Specification.

(1 SHEET.)

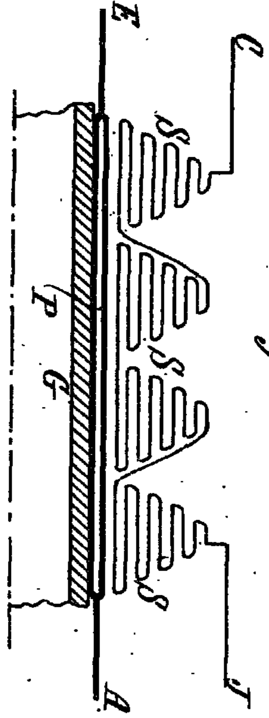

Fig. 2.

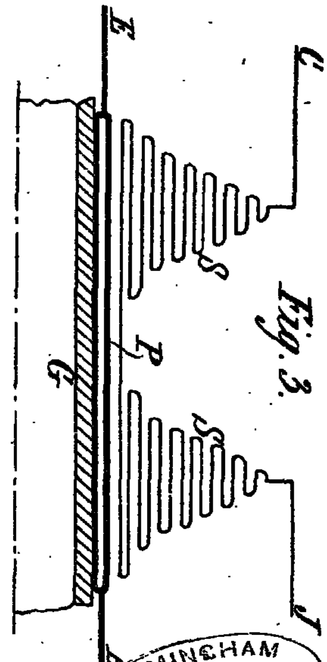

Fig. 3.

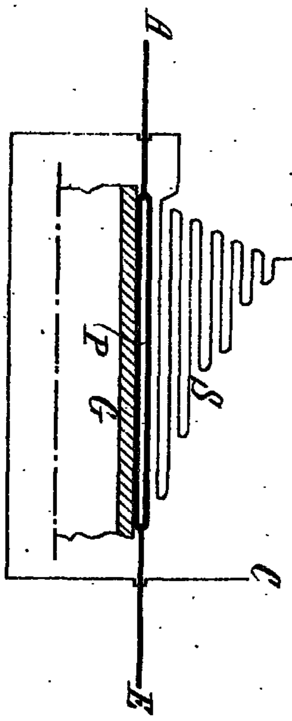

Fig. 4.

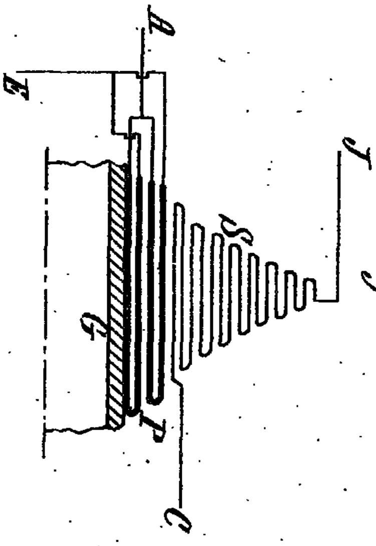

Fig. 5.

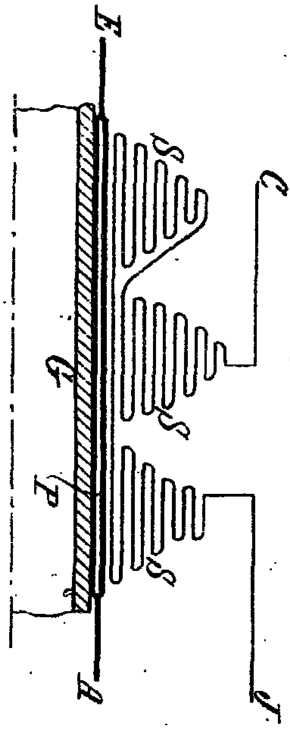

Fig. 1.

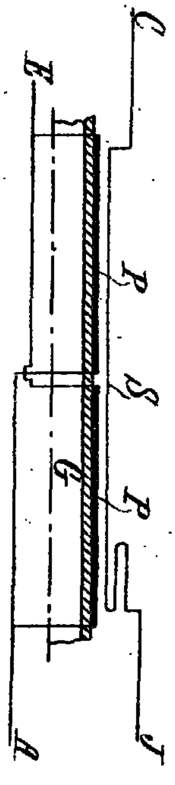

Fig. 6.

[This Drawing is a reproduction of the Original on a reduced scale.]

BIRMINGHAM FREE LIBRARIES.

Malby & Sons, Photo-Litho.